BioNanoSci. (2017) 7:570–573
DOI 10.1007/s12668-017-0451-x

The Effect of L-Ascorbate 1-(2-Hydroxyethyl) -4,6-Dimethyl-1,2-Dihydropyrimidin-2-One on the Regeneration of the Planarian *Girardia tigrina*

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Published online: 25 September 2017
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Abstract The effect of L-ascorbate 1-(2-hydroxyethyl)-4,6-dimethyl-1,2-dihydropyrimidine-2-one, a co-crystal of Xymedon with ascorbic acid, derived from pyrimidine on the regeneration process of the planarian *Girardia tigrina* (Girard, 1850) has been investigated. Being a co-crystal of Xymedon with ascorbic acid, the preparation is characterized by the improved properties compared to Xymedon. The new preparation falls within the group of hepatoprotectors capable of liver regeneration in response to various destructive factors. It has been shown that the new preparation at different concentration levels can inhibit planarian head regeneration. Two combinations of the test substance were used in the work: a neat form of the preparation; a mixture of the preparation with Na2CO3 to reduce the acidity of the test substance. The neat preparation showed a statistically insignificant tendency to an increase in the regeneration of *G. tigrina* planarians. When mixed with Na2CO3, the preparation inhibited the regeneration of *G. tigrina* planarians. *G. tigrina* planarians is a popular model for studying regeneration processes and stem cell proliferation.

Keywords Regeneration · Planarians · Pyrimidine bases · Proliferation

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1 Introduction

Searching for new hepatoprotectors promoting liver cell proliferation has recently gained an increasing importance, because of various factors, such as liver dysfunction and disorders, infections, unhealthy feeding habits, and environmental pollution [1]. L-ascorbate 1-(2-hydroxyethyl)-4,6-dimethyl-1,2-dihydropyrimidine-2-one (below referred to as *preparation 1*), a co-crystal of Xymedon with ascorbic acid, is a new promising hepatoprotector synthesized in Russia. Xymedon has already proved its efficiency as a regenerative [2] and immunostimulatory preparation, especially as a hepatoprotector [3]. There are also data on the actoprotective (preparations that increase physical activity) and neuroprotective action of Xymedon derivatives [4–7]. In order to investigate the proliferative activity of *preparation 1*, we used a culture of the planarian *G. tigrina* (Plathelminthes, Turbellaria, Tricladida) as a test object. These planarians serve as a model that suits perfectly for studying regeneration processes and proliferation of stem cells [8]. The purpose of this paper is to analyze the proliferative activity of *preparation 1* at different concentrations on the regeneration of the planarian.

2 Material and Methods

The experiments were performed on *Girardia tigrina* (Plathelminthes, Tricladida) asexual freshwater planarians. The planarians were obtained at the Institute of Cell Biophysics RAS, Pushchino, Russia. The planarians were precultured in fish tanks at the temperature of 26 °C and fed with dipteran larvae. The planarian specimens used in the experiments had the body length of 10–11 mm and were kept in starvation for 7 days. Regeneration was initiated by amputation of the head end in the area of eyes. A